PAPERS READ.

LIST OF PLANTS IN USE BY THE NATIVES OF THE MACLAY-COAST, NEW GUINEA.

By N. de Miklouho-Maclay.

With some Botanical remarks by Baron Ferd. von Mueller.

Revising my notes of the Ethnology of the Maclay-Coast, I made a list of plants, the parts of which (roots, stem, bark, leaves, flowers or fruits) are used by the natives as articles of food, as stimulants, or other purposes.

Some of these plants are cultivated by the natives in their plantations, some are gathered at certain times in the forests. The planting of the food plants is so arranged, that the natives are provided the whole year round with some special kind of food. The season of ripening of the principal food plants (taro, yams, sweet potatoes, &c.), is however not the same in different villages, but varies according to their different position, on the coast or in the hills. The time of collecting the products of cultivated plants mentioned in this paper refers to the coast villages, principally near to my two residences (Garagassi in 1871-72 and Bongu in 1876-77), near the Port Constantine.

On my return from New Guinea in 1873, I was fortunate enough to see in Java Dr. R. H. C. C. Scheffer, Director of the Botanical Garden of Buitenzorg, and of meeting Dr. O. Beccari in Singapore in 1878. I did not neglect during these interviews to ascertain, with their help, the systematic names of some plants, about which I was doubtful, and in which cases I had brought with me from New Guinea the fruits, or leaves and flowers.

A short visit to Melbourne in the beginning of this year, gave me the opportunity of consulting Baron von Mueller about some other plants from the Maclay-Coast, of which I had the fruits preserved in alcohol. Having neglected to obtain in New Guinea in addition to these fruits, the leaves and flowers of the same plant, the very incomplete collection would have been quite valueless, if it had fallen into less competent hands than those of the Baron von Mueller, and I feel very glad of being enabled to express my gratitude for his kind help. So, only through the kind assistance of these friends, I am able to give here the following list of useful plants, which are of great value in the household of the natives of the Maclay-Coast.

I. Plants used as Articles of Food by the Natives in order of their domestic importance.

A. Plants cultivated in plantations, or round the huts in villages.

1. *Cocos nucifera (Munki)* (1) bearing fruits the whole year round, is, without doubt, of the greatest value as food for the natives. The pulp of the nut is eaten in all stages of maturity. The scraped pulp of old nuts is used in cooking on account of its oily quality, but oilmaking and oil were not known to the natives before my arrival in 1871. There are two varieties of the cocoanut palm: the ordinary, with the large green nuts, and the other with the shorter stem and much smaller, orange coloured nuts. (2)

2. *Caladium esculentum (Bau)*, 3 or 4 var., some of them of large size, is next to the cocoanut, the principal article of food of the natives, from March to August, being usually planted in October.

(1) The native names of plants in the dialect of Bongu (of the Maclay-Coast) are added in parenthesis.

(2) The larger nuts of the ordinary green kind contains in the average 1200-1600 grammes of water, the smaller, orange coloured ones, in the average not more than 150 grammes. About the preparation of food by the Papuans and other details, vide my paper: Ethnologishe Bemerkungen über die Papuas der Maclay-Küste, publ. in Natuurkundig, Tijdschrift of Batavia, 1875. A review of which is given by Dr. J. C. Galton in "Nature" of June 1st and 8th, 1875.

3. *Diascorea Spec* (*Ayan*), many varieties, is eaten from August to January.

4. *Ipomaea Batatas* (*Degargol*). The sweet potato is, next to to the Taro and Yams, the most important article of food, and is ripe usually in September and October.

5. *Musa paradisiaca* (*Moga*), 8 or 9 var., are cultivated in some villages on a large scale, in others in limited quantities. Besides the cultivated varieties, which have been obtained by exchange between the villages, there is to be found in the forest a *wild* Banana (*Musa Maclayi*, F. v. M.), compared to the cultivated varieties, with a tall stem (nearly twice as tall), with narrow stiff leaves and small (not edible) fruits full of seeds. (1)

6. *Saccharum officinarum* (*Den*). Besides the many cultivated varieties there is also a *wild* Sugarcane, with a thin darkish stems growing in marshy localities.

7. *Saccharum* (*edule Hsskl?*) (*Aus.*) (2) The panicle of this cane, which ripens in January and February, is eaten, stewed, or baked on coals, and is very much liked.

8. *Psophocarpus spec.* (*Mogar*). (3)

9. *Artocarpus incisa* and *A. integrifolia* known under the general name: *Boli*. There are 5 var. at least. The bread-fruit trees are

(1) There is also another kind of *wild* Banana (*Musa Calosperma* F. v. M.), with fruits containing very large irregularly shaped seeds (about 10 mm. long and 11 mm. in diameter), which, when ripe, are of a brilliant black colour, are greatly used by natives as ornaments. About the two new species (*M. Maclayi* and *M. Calosperma*), vide Appendix, p. 355 and 356.

(2) Having neglected to obtain in New Guinea a specimen of "Aus," I could not ascertain the specific name of this graminea, but remembering that one of my servants, a Javanese, assured me many times that he knew the same plant in Java, used to call it something like "Grubuk," I wrote to the Director of the Botanical Garden of Buitenzorg and received a few days ago the following answer: . . . . Une plante appelée "*grubuk*" or "*groubouk*," n'est pas connue chez les malais et les soundanais. Cependant une Graminée savoir: le *Sacharum edule* Hasskrl. est appeé "*troubouk*," ou "*tebou troubouk*" par les Malais, j'ose supposer que le nom de "troubouk" est le vrai nom de les plante en litige. (Extract from the answer from Dr. W. Burck, Direct. adj. of the Bot. Gard. of Buitenzorg.)

(3) *Vide* Appendix, p. 358.

planted in or near the villages, but are to be found also not unfrequently in the forest.

10. *Canarium commune* (*Kengar*). Trees mostly planted, but growing also in the forests ; are to be found very numerous in some villages, but are scarce near others. The nuts are gathered in May, June and July.

11. *Sagus spec.* (*Buam*). On account of the scarcity of this palm, the sago is regarded as a luxury, is seen only at feasts and is not an article of daily diet.

12, 13, 14, 15. Different kinds of *Curcubitaceæ* as : *Holl*, *Arwan*, and others.

B. *Plants of the forest sought for on account of their fruit, used as food.*

16. *Pangium edule* (*Orlan*) (1). The fruits are hung in great baskets upon trees in the forest ; the pulp and kernels produce by fermentation an acid, very strongly, rather unpleasantly (to my olfactory nerves) smelling sauce, which mixed with food is considered by the natives as a great delicacy.

17. *Bassia cocco* (*Natê*) (2). the green fruit of which not larger than a middle sized apple have an agreeable sweet taste.

18. *Bassia Maclayana*, (Ferd. v. Mueller, n. sp.) (3), (*Dim*).

19. *Pandanus spec.* The fruits of different Pandani are eaten, raw or stewed.

20. *Barringtonia spec.* (*Togali*).

21. *Mangifera indica ?* (*Oei*). The fruit small and rather acid, but quite edible ; they taste better (less acid) when stewed.

22. *Citrus spec. ?* The fruits have a very thick skin and are so bitter that they are scarcely eatable.

(1) *Vide* Appendix, p. 356.
(2) *Vide* Appendix, p. 357.
(3) *Vide* Appendix, p. 357.

There are at the Maclay-Coast some other fruits which are gathered in the forest, whose systematical names however remain for the present unknown to me. I mention here the following names of Papuan fruits, which I frequently saw eaten and which I have tasted more than once myself without finding them either nasty or nice. They are:—

23. *Awal.*

24. *Bugger.*

25. *Kabul.*

26. *Aul.*

II. Cultivated plants used as stimulants and medicine.

27. *Areca catechu* is cultivated in every village and the kernel of the nut is used at the different stages of maturity, but young nuts are preferred.

28. *Piper betel.* The fruits are used in preference to the leaves. The natives of the Maclay-Coast have no remembrance, if the use of this (Areca-betel-lime) chewing combination has been introduced amongst them, by whom and when. Generally, the men are very fond of this stimulant, but very few use the same to excess.

29. *Piper methysticum* (*Keu*). The first mention of the use of the *Piper methysticum* by the natives of New Guinea, is, as far as I know, to be found in my letter to the Imp. Geogr. Society of St. Petersburg (1). When I showed in 1873, some dried leaves and fruits of the *keu* of the Maclay-Coast to Dr. Scheffer, he told me, that none had ever been brought by travellers returning from New Guinea and not having specimens of *P. methysticum* in the collection of the Botanical Museum of the garden of Buitenzorg, nor sufficiently complete descriptions of the plant, he was not able to tell me positively if the *keu* of New Guinea (2) is identical with it, the *kava* (*P. methysticum*) plant of the South Sea Islands.

(1) "Iswestia" of the Imp. Russian Geographical Society for 1874, Vol. X., p. 83.

(2) *Keu* is the name of *P. methysticum* in the dialect of Bongu, but in the other dialect of the same coast it is called: *keuwa, isse, kial, ayo, segu,* etc.

I wrote therefore to a friend of mine in Samoa and received from thence some leaves and fruits of the *P. methysticum*, which enabled Dr. Scheffer to make sure that the *keu* is the true *P. methysticum* of the Islands of the Pacific. (1)

All natives of the Maclay-Coast do not use the *keu*, in some villages this stimulant and its effect are known, but the use of it has not been adopted; in some others, it is not known at all. These facts makes me think, that the custom of drinking the *keu* has been introduced on the Maclay-Coast not very long ago (the natives however have no tradition about its introduction) and is still in the progressing stage.

The *keu* shrub is cultivated in the villages and on plantations, but I never heard that it grows wild at the Maclay-Coast.

I may add here an interesting fact, told me by Rev. W. G. Lawes in answer to my enquiries concerning the use of *P. methysticum* on the South-Coast of New Guinea. Mr. Lawes informed me, that as far his experience goes, the use of this stimulant is completely unknown to the natives of the South-Coast of New Guinea and the Louisiade Archipelago, but, that the plant (*P. methysticum*) is growing wild in many localities in the forest. The Rev. W. G. Lawes has been often told about it by missionary teachers, who being Polynesians (from Tonga, Samoa, and Tahiti), knew the *kava* plant well.

30. *Zingiber officinalis* (*Li*) is used as a dainty-dish after meals, mixed with ashes, the native substitute of salt (2) and as an *onim* (medicine).

31. *Cinnamomum sintoc* (*Muiu*). The bark is esteemed by the natives as an *onim*.

(1) Annales du Jardin botanique de Buitenzorg. I., p. 51.

(2) Besides the sea-water ($\frac{1}{3}$ to $\frac{2}{3}$ of fresh water) which the natives use to cook their food, they have another substitute for salt—the ashes of logs of trees which after floating in the sea for months are cast up at high tides and which are collected, dried and burnt by the natives—the ashes procured in this way, has a saltish taste. This kind of salt is principally used by the hill natives who find it more convenient to carry logs than bamboos filled with salt water.

32. *Nicotiana tabacum* (*Kas*). The old natives of this Coast remember, that they were told by their fathers, that in their youth they (the fathers) were not acquainted with the use of tobacco and that the seeds and the knowledge of smoking have been introduced and have spread from village to village from the west. There are some villages in the mountains of the Maclay-Coast where the custom of smoking has not yet been introduced (1). The dried tobacco leaves are, before smoking, dried on a fire, after which they are torn, crushed and rolled in a leaf (2), also previously dried on fire, in the shape of a big cigarette and smoked. In some hill villages, the natives haves large bamboo pipes (3), which are filled with tobacco smoke from a cigarette and smoked by many people in turn, every one trying to inhale and to swallow as much of the cold smoke as he can. The use of the pipe has not been adopted by the coast natives, who prefer to smoke cigarettes.

III. Plants useful in different ways in the household of the natives.

I will mention here some other plants, which are of importance in the every day life of the native of this part of new Guinea.

33. *Tauwi* (an Urticaceæ). The *mal* (4) of the men is manufactured just like the *tapa* of the Polynesians out of the bark of young Artocarpus trees, or the bark of the *Tauwi*.

(1) The use of tobacco in the Louisiade Archipelago has also been introduced quite lately. I visited in 1880 some hill villages on the Island Basilaki (or Moresby Island) where the natives where completely unacquainted with tobacco and smoking.

(2) The natives of the Maclay-Coast use the leaves of several plants as covering for their cigarettes, I am sorry however to say, that I have neglected to ascertain which are these special plants.

(3) Just like on the South-Coast of New Guinea, where the use of tobacco, according to the authority of Rev. Lawes, has been introduced from the West and only lately has spread gradually to the S. East extremity of New Guinea and now the *kuku* (the native name for tobacco on the S.E. Coast) is in the greatest demand.

(4) The *mal* is a piece of tapa of more than three yards in length and about a $\frac{1}{4}$ of a yard wide. It is worn thus: one end is held fast near the navel, the *mal* passed between the legs and then carried several times round the waist and the end finally tied on the back.

34. *Abroma Augusta* (*Mal-Sel*) (1). The *mal* of women, consisting of a fringe more or less long, is made out of the fibres of the banana stem, or of the fibres of the *Mal-Sel.*

35. *Gnetum spec.* (*Tavan-Sel*). The *guns* (bags) are woven out of strings twisted of fibres of *Tavan-Sel.*

36. *Vitis spec.* (*Nug-Sel*). Very strong strings are twisted and sometimes plaited out of the *Nug-Sel* and of

37. *Boehmeria nivea* (*Den-Sel*) and of

38. *Rol-Sel*, which is the stem of a plant belonging to the Leguminosœ.

39. *Calamus spec.* (*Bu-Sel*). For anchor ropes and different riggings in native canoes (which are sometimes two masted), as well as for binding the parts of the framework of huts and fences the *Bu-Sel* is generally in use.

As material for baskets and mats, leaves of cocoanut, sago and other palms are used.

The sail of canoes is a large square mat made of Pandanus leaves.

Spears, bows, ends of arrows, etc , etc., are made out of the outer portion of the stem of the cocoanut and caryota palms.

40. *Canarium gutur* (n. spec.) (*Gutur*). (2) The *damar*-like resin, which trickles out from the trees of this species of Canarium is called by the natives also *Gutur* and is used by them principally as a binding material in the manufacture of different implements.

41. *Calophyllum Inophyllum* (*Subary*). The boiled nuts are used as a kind of wash for the crisped hair of the natives after which operation (the subary-nut having made the wash oily) the kumu (3) sticks better to the hair. For the same purpose—hot, scraped pulp of old cocoa nut is also in use.

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(1) *Sel*—is the general name for string or rope.

(2) *Vide* Appendix, p. 357.

(3) The *kumu* or the black dye for body and hair of the natives of the Maclay-Coast is (after the analysis of Mr. R. Everwyn of the Mining Department in Batavia) Pyrolusite with a little oxide of iron.

PLANTS LATELY (SINCE 1871) INTRODUCED AT MACLAY-COAST.

Since my first arrival on this Coast in September 1871, some plants have been introduced by me at different times. I had the satisfaction of seeing in a small plantation round my house near Bongu, some of the introduced plants growing abundantly, as: different kinds of pumpkins, watermelon, indian corn, Carica papaya and many other plants, the seeds of which I brought with me (in 1871 from Tahiti and Java in 1876) (1). The natives were delighted to get the seeds and watched with the greatest interest the growth of the new plants. The papaya, the water melon and the indian corn became the favourites and were soon introduced in the plantations and the villages on the coast.

Numbers of natives from distant villages in the mountains came to pay me visits with the object of obtaining seeds from me.

On my last visits of the Maclay-Coast, in March 1883, I brought more seeds and seedlings (from Macassar and Amboina). There were inter alia, seed of the Mangustin (Garcinia), of the Durian, of the Orange, Lemon, Coffee, etc., etc. I distributed the seeds amongst the natives of the villages, Bongu, Bogati, Bili-Bili and of some hill villages, to whom I specially recommended the coffee seeds.

My next visit to the Maclay-Coast will show me the result of this last importation of useful plants, which, if it succeeds as the experiment of 1876, will prove to be a complete success.

Before I close, I will only add, that having the intention that this paper should be chiefly an addition to our knowledge of the Ethnology of New Guinea, I have given here *only* a list of the more important plants in the household of the natives of the coast, omitting some which are of quite secondary considerations to the natives, and which they use only as food in quite exceptional cases, when they have nothing better, as for instance, a species of Cycas, (from the stem of which they make a kind of sago) of a wild arrowroot, a species of Nephelium, etc, etc., etc. Some others (as for instance the Kapok-tree), I have not mentioned because the tree has no value (at present) to the natives.

(1) I have somewhere a list of these seeds amongst my papers, but can not at this moment place my hand upon it.

APPENDIX.

EDIBLE FRUITS FROM THE MACLAY-COAST, NEW GUINEA.

By Baron Ferd. von Mueller, K.C.M.G., M.D., F.R.S., &c.

From notes and drawings furnished by my distinguished friend, I am able to add to his account of *Musa Maclayi*. It belongs to the series of species, which in *M. uranoscopos* has its longest known representative. The flower stalk is upright or but slightly curved; bracts are red-brownish; the flowers occur about eight together; the lobes of the calyx measure nearly an inch in length, the fruits are about three inches long, but hardly more than one inch broad, faintly angular; the seeds are irregular in shape and often compressed. This *Musa* occurs on swamps and along streams.

This seems an apt opportunity for referring to an allied species: *Musa Seemanni* of Fiji, from whence it was first recorded by Dr. Seemann as *M. uranoscopos* (Fl. Vit., 290.) Specimens kindly transmitted by the hon. J. B. Thurston, C.M.G., enable me to offer the following notes on the Fiji plant. Flower stalk erect, about four feet long and to four inches thick; the bracts imbricate, the longest measuring fully one foot; total fruit spike about $1\frac{1}{2}$ feet long, forming fascicles moderately crowded on all sides; fruits ellipsoid-ovate, remarkably blunt, 3 to 4 inches long, when aged blackish-brown outside and shining, with three of the longitudinal angles more prominent; pulp very succulent, of not unpleasant taste, from brown-yellow to vitellinous in color; pericarp thinly coriaceous; ovules numerous, turbinate-discoid, reaching in the ripe fruit not to beyond one lines length, outside blackish-grey. This species differs from *Musa Hillii* already in having the fruit-fascicles

far less crowded, and the berries much less angular, also not remarkably attenuated at the summit. *M. uranoscopos*, *M. Hillii* and *M. Maclayi* should be cultivated side by side, so that their respective characteristics could be carefully studied from the living plants. I am informed, that the last mentioned produces suckers.

Musa calosperma is as yet only temporarily named, as merely seeds have been obtained, so that even the generic position needs yet to be confirmed. These seeds came from Moresby Island; and the seeds are also used as ornament by the natives on the eastern and southern coast of New Guinea; but the fruits are not eatable. An only seed seen by me, had been taken from an ornamental string, and thus had lost its albumen and embryo; it is about half an inch long and broad; the testa is of bony hardness and comparatively thick; at one extremity it opens into an ample cavity which communicates by a seemingly natural narrow perforation, with the still wider and not very high central cavity, into the middle of which the cross-septum somewhat protrudes; on the other side of the central cavity a smaller separate hollow exist, which is connected with a slight external excavation. It has been deemed advisable to give at once some account of the remarkable structure of this seed, in order that speedy attention may be drawn to the desirability of tracing this perhaps not uncommon Papuan plant to its primeval habitation, for obtaining thus full material for specific elucidation also.

(*Leaves and flowers not obtained*).

"*Orlan*" *Pangium edule*, (Reinwardt). "This fruit is suspended in bags within forest localities till it becomes sour." Professor Miquel avers, that this tree is wide spread over the Sunda Islands and Moluccas, probably however through cultivation only; it is there known to the antochthones under various names, all however dissimilar to the Papuan one; the inner pulps separates in very angular masses, each of which invests a seed; the cotyledons are more or less flexuous. Fruit not dissimilar to that of Hydnocarpus heterophyllus.

"*Dim*," *Bassia Maclayana*. (F. v. Mueller). This has been designated in honor of the finder. A globular five-celled fruit of large size (measuring about five inches in diameter), which presents all the carpologic characteristics of the genus Bassia among Sapoteæ; the pulpy portion is copious and adheres firmly to the endocarpal plates; the seeds measure about $1\frac{1}{2}$ inch in length and fully one in width; the testa is very thick, of long firmness and outside shiningly brown-black; the hilum is remarkably broad. When the flowers shall have been obtained, we will be able to judge, whether the tree yielding this very conspicuous fruit is perhaps to be counted with the species of the genus Lucuma, as now defined, no generic fruit-differences existing between Lucuma and Bassia; but the latter should change its name for *Illippe*, as already 1771 given by Koenig (Linné, mantissa altera 563) inasmuch as Allioni five years earlier fully established a genus Bassia among Salsolaceæ.

"*Nate*." Bassia Cocco (Scheffer in Annales du jardin botanique de Buitenzorg, L 34.) The fruit is irregularly traversed by several longitudinal furrows. Dr. Scheffer (in 1876) also saw fruits only; hence the generic position of this tree remains still somewhat unsettled.

"*Gutur*." Canarium, the species from the mere fruits undefinable. "A tree exuding a resin not unlike Damar." Only unripe fruits seen, which in that state are prominently triangular, hardly half as broad as long and somewhat pointed; the fruit-calyx spreads horizontally, and is only short-lobed. The seeds are eatable, (1) and are probably of the same almond-like taste as those of Canarium commune. Concerning the latter already Gaertner (de fructibus II., 99) observed, that even in very old fruits the seeds do not become rancid, although they are so very oily. He also noticed (as far back as 1791), that fruits of Canarium not rarely ripen three seeds, as remarked also recently by Engler (De Candolle, monogr. phanerog. IV., 101). Since now already more

(1) I am *not* sure if the seeds are eaten or not. M.M.

than half a hundred species of Canarium have become clearly defined merely from India (continental and insular), we may expect a considerable access still to the few recorded Papuan congeners.

"*Mogar.*" The pod of a leguminous plant resembling that of Psophocarpus tetragonolobus, and also that of Cassia alata. "A climber; the seeds edible." Fruit very prominently quadrangular; valves thinly coriaceous, pulp as well as septa none; seeds small in proportion to the width of the fruit, placed longitudinally, not provided with any elongated funicle, but supported by a short narrow strophiole; areole on each side wanting, albumen seemingly none; cotyledons (in hardly ripe seeds, such as come under notice here) straight.